product data sheet

LDK 8000

Multi-Format High-Definition Production Camera

Grass Valley™ products from Thomson offer the most comprehensive, multi-format solutions for acquisition, production, storage and playback—with a strong foundation for centralized, proactive status and activity monitoring. These solutions include one of the broadest selections of standard- and high-definition (SD and HD) digital video cameras. With one of the best known imaging design teams in the world and six technical Emmy® awards, Grass Valley camera products continue to break ground with innovation and creative ideas.

The LDK 8000 camera continues and extends this record of exceptional performance. Leveraging our extensive experience in digital cinematography, we designed this HD camera specifically to sample a chosen scene so that it faithfully reproduces what you see. Its color-space technologies ensure accurate color reproduction even in difficult applications, such as mobile production sites where lighting is typically difficult to control.

With three next-generation 9.2-million pixel HD-DPM+™ CCDs, the LDK 8000 is the only camera available that can capture true progressive HD images, natively, and switch instantly between multiple formats and frame rates. Coupled with an extensive feature set, format flexibility, and excellent performance, it's a perfect match for the intense demands of today's productions.

This flexibility makes LDK 8000 a superb choice for live production where content will be used for HD DVD distribution. With its 1080p origination, selectable in frame rates up to 1080p60, your finished material can closely resemble material finished on film.

With an updated ergonomic design, the LDK 8000 speeds production workflows with focus-assist tools and smart cards that store image and operational settings. Its transmission system interfaces include those for standard HD triax- and fiber-based infrastructures for maximum flexibility. And its optical design, coupled with a new DSP chipset, gives you even greater confidence in delivering excellent finished program material.

The LDK 8000 system features a compact, robust, and lightweight base station that can output SD and HD signals simultaneously. And by using a Grass Valley SuperXpander large lens adapter kit, complete with an HD high-resolution viewfinder, the LDK 8000 becomes a fully featured, full-sized studio camera ready for either studio or mobile applications.

CCDs Ensure Exceptional Output

Three next-generation CCDs inside the LDK 8000 ensure exceptional image quality. They are based on frame-transfer technology to guarantee there is no lag or smear to compromise the images you create. These sensors also deliver outstanding signal-to-noise ratio and sensitivity, using on-chip amplifiers to further reduce the noise floor.

The LDK 8000 also features the on-sensor black sampling used so successfully in previous camera designs. With it, you don't need to set a black balance or black level for each scene and then hope things turn out correctly. The selected on-sensor areas are masked from incoming light, and are therefore always sampling a correct absolute black level. The camera samples black levels continuously, per frame, ensuring that the black level is always correct as defined at the sensor surface. Its 14-bit analog-to-digital converters preserve this sampled image as it is transferred from the sensors to the digital processing domain.

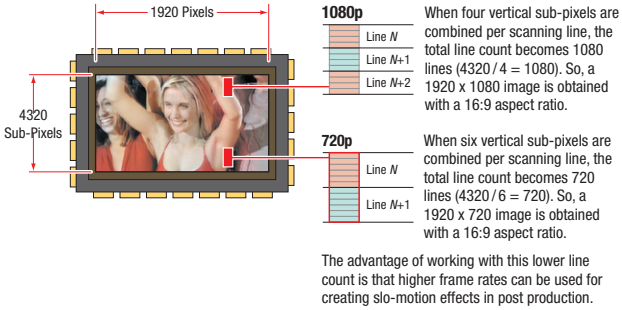
key features

- Supports instant switching between 1080i and 720p formats at 50 and 59.94 Hz for a wide variety of applications
- Supports all 1080p standard formats, including 1080p50 and 1080p60
- Unrivaled video sampling technology:
  - —Three 9.2-million pixel HD-DPM+ CCDs
  - —14-bit A/D sampling
  - —22-bit digital signal processing resolution
- Emmy award-winning dual skin contour circuit makes talent look its best
- Dynamic anti-aliasing-on-sensor processing reduces aliasing artifacts
- Unique viewfinder focus-assist tools:
  - —Crawler, for creating an active edge around all objects in focus
  - —Instant push-button electronic zoom for momentarily enlarging a subject to check focusing on small details
- Smart cards store image, operational settings for easy recall
- Flexible HD transmission system
  - —Supports standard triax up to 3,500 ft. (1,200m)
  - —Supports hybrid fiber SMPTE 311 up to 13,200 ft. (4,000m)
- Small, robust base station with superior HD, SD output
- Lightest weight camera body in its class
- SuperXPander kit support enables configuration with full size studio or OB lenses, and accessories
- Outputs high-quality SD images simultaneously to the HD output

THOMSON images & beyond

Dynamic Pixel Management

By grouping the 4,320 vertical sub-pixels on the CCDs to map to the desired line rate, all popular video formats can be acquired without compromising image quality.



When four vertical sub-pixels are combined per scanning line, the total line count becomes 1080 lines (4320 / 4 = 1080). So, a 1920 x 1080 image is obtained with a 16:9 aspect ratio.

When six vertical sub-pixels are combined per scanning line, the total line count becomes 720 lines (4320 / 6 = 720). So, a 1920 x 720 image is obtained with a 16:9 aspect ratio.

The advantage of working with this lower line count is that higher frame rates can be used for creating slo-motion effects in post production.

Easy, Native HD Format Switching

The LDK 8000 continues the easy HD format switching so successfully introduced with earlier camera models. The camera's CCDs switch the pixels on the sensors to create the correct number of video lines necessary for a chosen format, minimizing the need for any further electronic processing.

The result? No quality degradation when switching formats.

The image formats available using the LDK 8000 include 1080i and 720p formats at 50 and 59.94 Hz, as well as all 1080p standard formats, including 1080p50 and 1080p60 to future-proof your investment.

Digital Signal Processing Chipsets

The LDK 8000 includes an all-new DSP chipset and an updated software base that performs all camera image-management functions such as knee, gamma, contours, and variable matrix, with 22-bit digital precision.

Among the functions of the new chipset is color-temperature correction. A wide choice of color temperature settings is available and ensures repeatable accuracy at each color temperature point. This is one of the key differences between LDK camera architecture and other cameras: it does not use optical color-correction filters.

In addition to providing extra color-temperature steps at standard points, the chipset lets you apply a continuous correction between standard color temperature points. This capability ensures that colors will always appear natural, as they are corrected according to the actual ambient color temperature sampled at the scene—and not limited by the preset values of a small number of optical filters in a filter wheel. Compared to traditional optical filtering, this approach provides much better speed, flexibility, and color accuracy; it is particularly valuable for the difficult lighting typically encountered in mobile applications, but is also very useful when you need to accurately reproduce the vibrant colors of a studio from difficult camera angles.

The new chipset contains additional powerful features, such as digital cosmetics with independent, Emmy award-winning dual skin contour circuits to improve facial tones, as well as extensive colorimetry and color-matching capabilities. You can also choose whether you prefer to perform matrix processing before or after gamma; the selection process is so easy that you can experiment either way with minimum difficulty.

Two Versions Available

The LDK 8000 camera head is available in two versions: Standard and WorldCam. The Standard version supports 1080i/720p HD formats in 50 and 59.94 Hz, and simultaneously provides high-quality SD output in either 50 or 59.94 Hz.

The WorldCam version provides all the functions of the Standard version as well as support for digital cinematography formats in 1080p and 720p. These formats provide an impression of motion (motion portrayal) comparable to that of film cameras running at the same speeds.

The WorldCam version of the LDK 8000 also provides convenient built-in frame-rate conversion for easy connection to existing HD peripherals. As a result, you get cost-effective monitoring and recording combined with the motion portrayal of film cameras. The 1080p format at 23.98 Hz, for example, can be converted using 3:2 pull-down to 1080i at 59.94 Hz right inside the camera.

Convenient Assist Tools to Speed Production

The LDK 8000 includes a number of features to speed the production process, from focus-assist tools to smart cards.

For precise focusing, which is especially crucial in a high-resolution HD environment, the camera includes a patented "crawler" that creates a motion effect on the edges of an object in sharp focus; the contrasting motion helps a camera operator quickly fine tune that focus.

The camera also features a unique electronic viewfinder zoom function that instantly enlarges an image with a simple press of a button; it's ideal for focusing on small details.

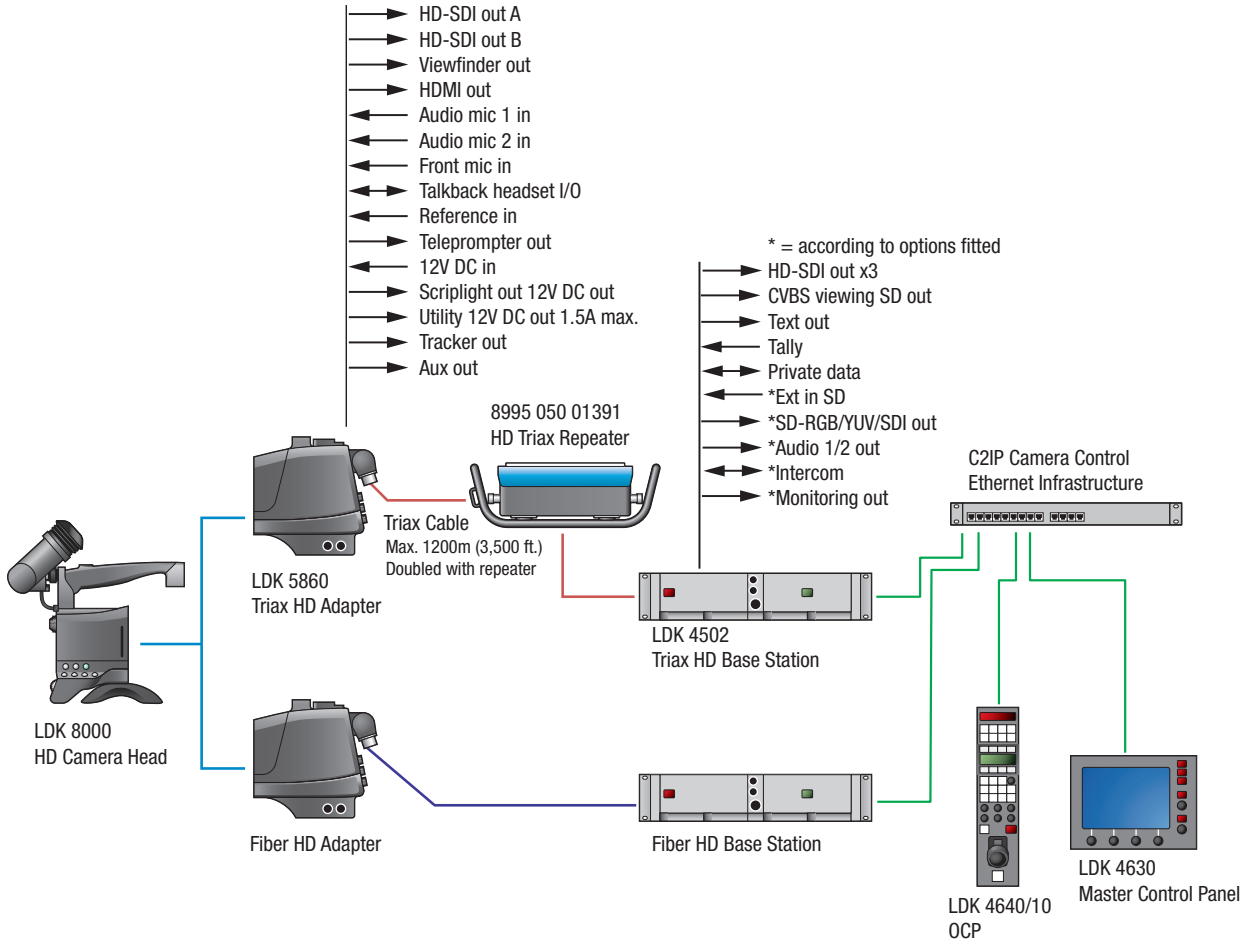
It's also easy to pre-configure the LDK 8000 for a variety of different settings—from sports and drama applications to commercial and drama studio settings—by storing operational and image settings on low-cost smart cards. Not only can these camera settings be recalled quickly, you can also write to the cards and transfer them between cameras for fast reconfiguration. Settings established off-line in rehearsals can be quickly and accurately repeated during a live show.

At a more detailed level, mobile companies regularly delivering sports production from a known set of venues, can save and recall values for each one, making setup extremely quick and reliable.

Additionally, with its true progressive digital cinematography formats, the LDK 8000 WorldCam can address applications such as episodic television or sitcoms, which often require the special motion portrayal of dedicated digital cinematography cameras.

In a worst-case scenario, when the camera has been adjusted far from any normal settings, it takes just two seconds to recall a factory setting. You can also substitute a preferred studio setting for the factory recall setting. In this case, the factory file is only displaced, not deleted.

LDK 8000 HD System



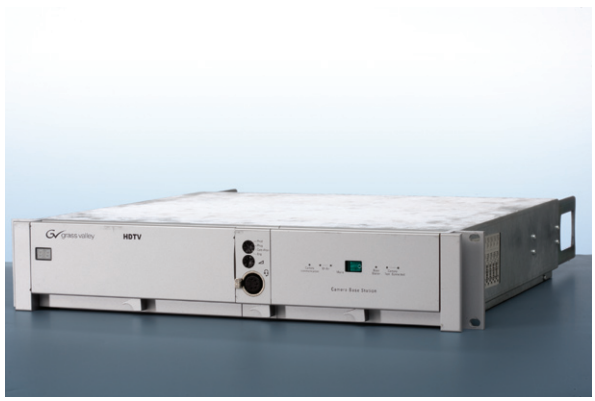
Lightweight, Ergonomic Design Ensures Comfort

The LDK 8000 features a lightweight, balanced design for maximum comfort and freedom of movement. A magnesium-alloy body provides a high degree of durability, yet helps keep the camera the lightest in its class. An optional zoomcontrol on the top handle makes awkward ground-level shooting easier, while a rotary TriaxHD connector ensures that the cable is free to move with the camera as it follows the action.

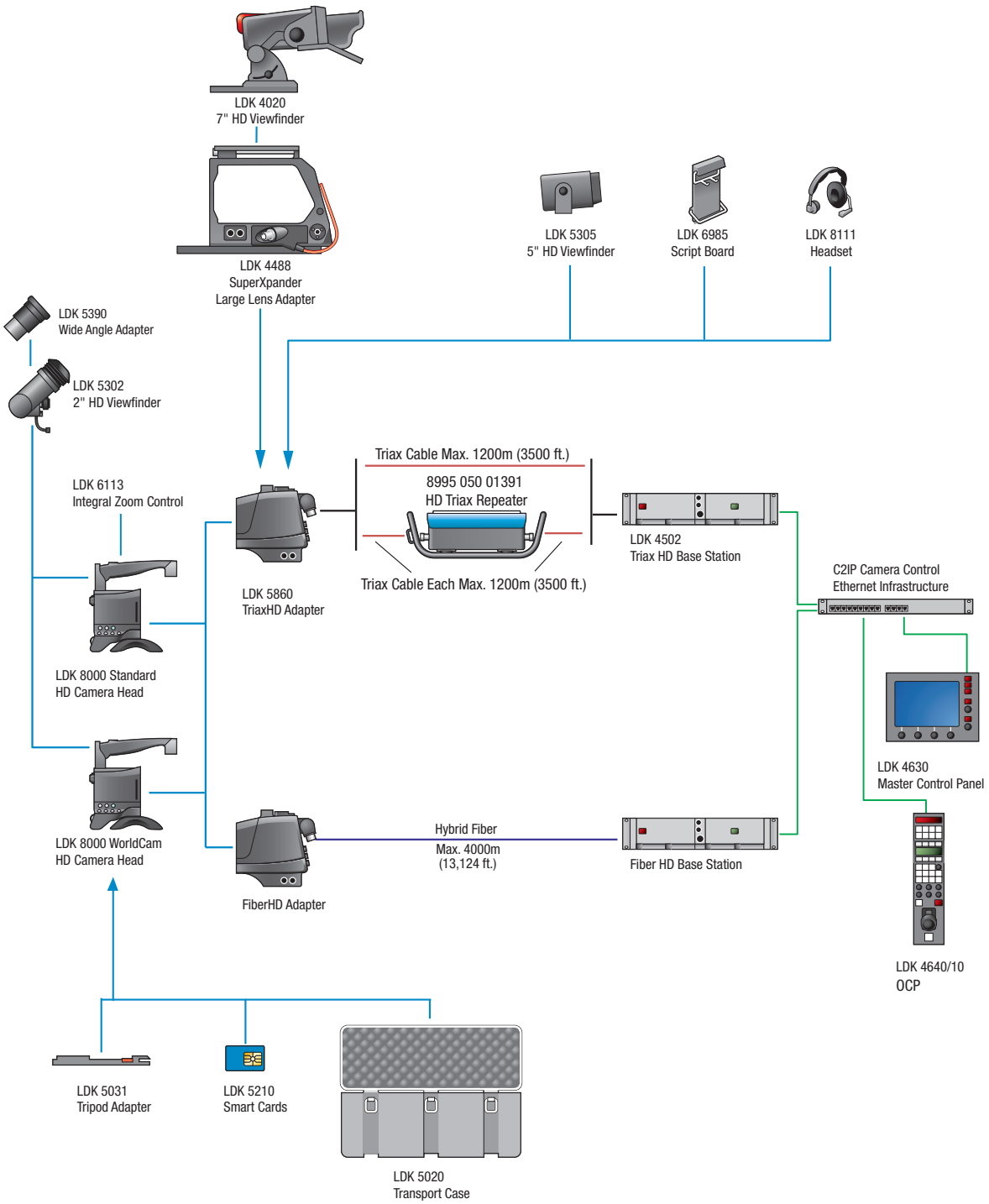
Flexible and Future Proof

The LDK 8000 is designed for flexibility and cost-effective compatibility. Its docking concept, for example, makes it suitable for all applications. Newer applications are being developed continually.

The lightweight LDK 8000 is perfectly suitable for hand-held operations. Alternatively, using the optional Grass Valley SuperXPander kit, you can quickly turn the portable camera into a fully featured studio camera in either triax or fiber mode.



HD Camera Family



Specifications

HD Camera Head	LDK 8000	
General		
Power	Triax or DC 12V; 44W incl. 2" viewfinder & Triax HD adapter	
Temperature range	Operating: -20°C to 45°C (-4°F to 113°F); Storage: -20°C to 60°C (-4°F to 140°F)	
Weight	5.5 kg (11 lbs.) incl. 2" viewfinder and Triax HD adapter	
Dimensions	241 (H) x 164 (W) x 373 (L) with Triax HD adapter	
Camera		
Optical system	F1.4 Prism	
Optical filter wheels	2x motorized wheels	
Optical filters on first wheel	Clear, 1/4 ND, 1/16 ND, 1/64 ND	
Optical filters on second wheel	Clear, four-point star, six-point star, soft focus	
Color-correction filters (digital process)	Electronic: 3200°K, 5600°K, 7500°K, FL, 2 AWB presets, continuous auto white	
Pickup device	3 x 2/3" 16:9 HD-DPM+ CCDs	
Picture elements	9.2 million pixels 1920 (H) x 4320 (V) effective	
Smear	No vertical smear	
Temporal Frequencies	**LDK 8000/60 Standard**	**LDK 8000/61 WorldCam**
720p mode	50/59.94 Hz	23.98/25/29.97/50/59.94 Hz
1080p mode	Requires WorldCam version	23.98/24/25/29.97/50/60 Hz
1080i mode	50/59.94 Hz	50/59.94 Hz
Sensitivity 2000 lux	F8.0 typical (1080i mode)	
S/N ratio in Y signal	56 dB typical	
Modulation depth	55% @ 27 MHz (typical 720p59.94)	
Digital quantization/ DSP processing	14 bits A/D, with >22 bits DSP resolution	
Gain	-6 dB to 12 dB in 3 dB steps (user-definable presets)	
Exposure control	Down to 1/1000s	
Clean scanning	50.8 to 125 Hz (at 50 Hz temporal frequency); 61 to 150 Hz (at 59.94 Hz temporal frequency); V-shift	
Front microphone input	XLR-3 female, balanced +48V selectable	
Lens connector	12-pin	
Control input	9-pin RS-232C compatible	
Viewfinder connector	20-pin, and, HDMI connector	
Supplied accessories	Operators manual; camera rain cover; 1x owner card; 2x user cards; shoulder strap	
Options		
2" viewfinder	Model No. LDK 5302	CRT >600 TV lines (center)
5" viewfinder	Model No. LDK 5305	CRT >650 TV lines (center)
7" viewfinder	Model No. LDK 4020	CRT >800 TV lines (center). Requires additional mounting hardware
LDK 5860 TriaxHD Adapter		
Input connectors	Front mic in: XLR-3-31 type (female x1) balanced, +48V, ch1	
	Audio in: XLR-3-31 type (female x2), selectable phantom +48V, selectable attenuator	
	Video ref in, BNC type, 1.0Vp-p, 75Ω	
	DC 12V in: XLR-4 pin type (male x1)	
Output connectors	VF out, BNC type, 1.0Vp-p, 75Ω, switchable to external (SD+HD)	
	2 x BNC, SMPTE 292M, HD-SDI out: 1.5 Gb/s, 0.8Vp-p, 75Ω	
	Prompter out: BNC type, 1.0Vp-p, 75Ω	
	Scriptlight DC-out: 3-pin, 0.25A/12V DC	
	DC-out: 4-pin Hirose, 1.5A/12V DC and tally indicators	
Input/output connectors	CCU: triax connector	
	Lens: 12-pin	
	Viewfinder connector: 20-pin and HDMI connector	
	Auxiliary/data 11p private data	
	9-pin RS-232	
	Tracker: 11-pin	
	SmartCard	
	Intercom: XLR 5-pin (female x1)	

Ordering Information

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For specific requests, our worldwide experienced Support Services & Training experts can build and assist you with customized solutions.

For more information contact your authorized Grass Valley representative or visit us online at www.thomsongrassvalley.com/support.

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